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Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	
Amendment of the Commission's Rules to Establish Rules and Policies Pertaining to a Non-Voice, Non-Geostationary Mobile-Satellite Service	CC Docket No. 92-76

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COMMENTS OF ORBITAL COMMUNICATIONS CORPORATION

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SUMMARY

ORBCOMM supports the Commission's proposal to establish licensing and service rules for the new Non-Voice, Non-Geostationary Satellite Service. The proposed rules reflect the recommendations of the Commission's inaugural negotiated rulemaking proceeding. The Commission should continue to build on the positive momentum created by that process, and quickly adopt service rules and grant licenses in accordance with the rules recommended by the Committee and proposed in the Notice. The Commission determined in allocating spectrum for this new service that the public interest would be advanced by Non-Voice, Non-Geostationary Satellite Service, and prompt action will maximize those public benefits.

The licensing and service rules suggested in the Notice reflect two important underpinnings for this service: the need to accommodate multiple entry, and the need for flexibility. Thus, ORBCOMM supports the rules set forth in the Notice, with two exceptions. ORBCOMM believes that the Commission should include a renewal expectancy, and ORBCOMM urges the Commission to incorporate an explicit efficiency measure into the rules. As modified, the licensing and service rules will well serve the public interest.

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COMMENTS OF ORBITAL COMMUNICATIONS CORPORATION

Orbital Communications Corporation ("ORBCOMM"), a subsidiary of Orbital Sciences Corporation ("OSC"), hereby submits its comments on the Commission's proposal to establish licensing and service rules for Non-Voice, Non-Geostationary Mobile-Satellite Service.[1/] ORBCOMM was formed by its parent company to enter the mobile satellite services business. Founded in 1982, OSC is one of the country's leading commercial space technology companies. It is engaged in design, manufacturing, testing and operation of space launch vehicles, suborbital tracking and data systems, and satellite-based communications and remote sensing systems.

In early 1990, ORBCOMM submitted to the Commission a petition for amendment of Section 2.106 of the rules to establish

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1/ Amendment of the Commission's Rules to Establish Rules and Policies Pertaining to a Non-Voice, Non-Geostationary Mobile-Satellite Service, CC Docket No. 92-76, FCC 93-28, released February 10, 1993 (hereafter "Notice").

a mobile satellite service using low-Earth orbit satellites and an application for authority to construct a satellite system.[2/] As a result of the ORBCOMM petition, and based on the overwhelming support for these new services, the Commission allocated spectrum for Non-Voice, Non-Geostationary Satellite Service.[3/] In addition, worldwide support led to a global primary and secondary allocation of spectrum for these services at the 1992 WARC.

In order to facilitate the development of licensing and service rules for Non-Voice, Non-Geostationary Satellite Service in a timely fashion, the Commission also convened an Advisory Committee to conduct the Commission's first negotiated rulemaking proceeding.[4/] ORBCOMM was a member of that Committee, and actively participated in the negotiated rulemaking. The Notice

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[2/] Orbital Communications Corporation, RM No. 7334, Public Notice Report No. 1814, April 4, 1990; Orbital Communications Corporation, File No. 22-DSS-MP-90(20), Public Notice Report No. DS-953, April 11, 1990. In addition, pursuant to experimental licenses, ORBCOMM has launched a satellite to conduct tests verifying the operational capabilities and characteristics of LEO satellites in the specific frequencies proposed for ORBCOMM's satellite system, and will launch two satellites this Fall to conduct additional developmental operations. Experimental License KE2XER, File No. 1549-EX-ML-90; Experimental License KE2XES, File No. 1550-EX-ML-90; Experimental License KE2XET, File No. 1551-EX-ML-90; Experimental License KE2XEY, File No. 1552-EX-ML-90.

[3/] Amendment of Section 2.106 of the Commission's Rules to Allocate Spectrum to the Fixed-Satellite Service and the Mobile-Satellite Service for Low-Earth Orbit Satellites, ET Docket No. 91-280, FCC 93-29, released February 5, 1993.

[4/] The Advisory Committee was convened by the Commission pursuant to the Notice of Advisory Committee, 57 Fed. Reg. 33163 (July 27, 1992), and the work of the Advisory Committee was reflected in the Report of the Below 1 GHz LEO Negotiated Rulemaking Committee, CC Docket No. 92-76, September 16, 1992.

is an outgrowth of that negotiated rulemaking, and represents one of the last regulatory steps necessary before ORBCOMM and others can begin providing Non-Voice, Non-Geostationary Satellite Service to the public.[5/]

The negotiated rulemaking consisted of an intensive series of meetings among all of the affected parties, along with an opportunity for public observation and participation in that process. The negotiated rulemaking Committee reached a consensus on nearly all of the issues raised by the Commission. The

all of this information in crafting the Notice. As detailed below, ORBCOMM supports the proposals in the Notice (with two minor exceptions), and urges the Commission to proceed expeditiously with the adoption of the licensing and service rules, as well as with the licensing of the systems. In allocating spectrum for Non-Voice, Non-Geostationary Satellite Service, the Commission recognized that the public interest will be well served through the availability of these new services. The prompt conclusion of this proceeding will ensure that those public interest benefits will be maximized.

I. ORBCOMM Supports the Regulatory Framework Proposed by the Commission in the Notice

ORBCOMM believes that the regulatory plan suggested by the Commission in the Notice will allow the service to develop fully and promptly. The requirements for the application process should allow the Commission to license the current applicants expeditiously, while also allowing for entry by future applicants. In addition, the operational rules should help ensure that spectrum does not lie idle, that service develops in a timely manner, and that the carriers' offerings can meet the needs of the marketplace.

Two basic themes should drive the service rules that are ultimately adopted by the Commission. First, multiple entry ought to be encouraged, because the resulting competition will minimize the need for regulatory oversight, and ensure that customers can obtain service at the lowest price and the highest

quality. In addition, competition will spur innovation by the competitors, to the benefit of the customers. Second, the rules must incorporate a fair measure of technical and operational flexibility, since this is a wholly new service using advanced technologies that have not previously been utilized for commercial operations.

The recommendations of the negotiated rulemaking Committee reflect these underlying themes. The current applicants developed a sharing plan that allows the three current applicants to operate within the limited spectrum allocated to this service, while also leaving opportunities for future entrants. In addition, the negotiated rulemaking Committee also took into account the different technical approaches proposed by the current applicants, and suggested a regulatory model that can accommodate these different technical solutions. Indeed, to some extent, it would be premature to detail many technical characteristics for Non-Voice, Non-Geostationary Satellite Service prior to gaining greater experience with the new services and technologies.

The application and service rules proposed in the Notice, which track the recommendations of the negotiated rulemaking Committee, similarly reflect these two basic policies of multiple entry and flexibility. Thus, as discussed below, ORBCOMM supports the proposed rules set forth in the Notice.

A. ORBCOMM Supports the Application Requirements Proposed in the Notice

ORBCOMM believes that the application requirements reflected in the proposed rules will provide the Commission with all of the relevant information for determining whether an applicant is qualified, and whether grant of a license will serve the public interest. Sections 25.114 and 25.142 of the proposed rules will require each applicant to include the necessary information on the characteristics of its system that will allow the Commission to evaluate the technical feasibility of the application. The detailed technical information will also provide the Commission with the information it needs to fulfill its responsibilities in coordinating the systems with other nations, since by its nature the LEO systems have the inherent capability to operate in foreign countries.[6/]

The proposed rules also specify particular demonstrations the applicant must include in the application, including non-interference to current Non-Voice, Non-Geostationary satellite system operators, compatibility with the government users in the band, and compatibility with the users of adjacent bands. ORBCOMM believes that the technical aspects of

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[6/] The 1992 WARC adopted a framework for international coordination procedures for non-geostationary satellite systems, as well as specifying the power flux density limits that would obviate the need for any coordination. The proposed rules will provide the Commission with the information it needs to meet these international obligations, along with the ability to request any additional information from the applicant. Moreover, the applicants will have strong incentives to assist the Commission in this process.

the application rules will ensure an adequate record for the Commission, without being too onerous for the applicants.

ORBCOMM also supports the financial showing required in the application. ORBCOMM is concerned that the limited spectrum available should not be tied up by speculative applicants that lack the resources to construct and operate a low-Earth orbit satellite system.[7/] Although the requirement that an applicant demonstrate the resources to construct and operate only the first two satellites in the applicant's constellation is probably too lax, the Commission retains the ability, through strict enforcement of the construction milestones, to ensure that spectrum will not be warehoused or lie idle while an applicant attempts to raise funding. ORBCOMM thus supports the financial qualification proposal incorporated in the Notice, and urges the Commission to make very clear its intention to enforce the construction and operation milestones.[8/]

7/ This has been a problems for satellite operators in the

B. ORBCOMM Supports the Operating Rules for Non-Voice, Non-Geostationary Satellite Service Proposed in the Notice

In recognition of the need for flexibility in the rules, the Notice properly leaves the specification of operational details for the licensing stage. Thus, for example, the Commission proposes that the application must specify precisely what frequencies will be utilized, including the designation of spectrum within the band for feeder link operations. The feeder link operations will be provided efficiently within the band, although as the Notice recognizes, intersystem sharing of feeder link spectrum would not be practical. In addition, the applications must indicate how the different applicants intend to share the spectrum.[9/]

The Commission will then assign frequencies for use by each of the applicants in the license. ORBCOMM supports this approach of declining to specify operational details in the rules themselves, since there will be a need for the applicants to coordinate among themselves, and with the government users. Attempting to use the rules to designate in advance specific frequencies for the different systems to operate in would make it

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[8/](...continued)
at least requiring the application to incorporate a service/efficiency calculation. See pp. 15-20, infra.

[9/] In the case of the initial three applicants, a joint sharing proposal was submitted to the Commission prior to the start of the negotiated rulemaking. Jointly Filed Supplemental Comments of ORBCOMM, STARSYS and VITA, submitted August 7, 1992. This joint sharing plan will allow all three current applicants to operate in the spectrum allocated to Non-Voice, Non-Geostationary Satellite Service, and still allow room for future entry.

difficult to coordinate with the government users, and would not permit the applicants to select the best technology for their proposed systems. Although operating experience might later allow the Commission to define more narrowly in the rules the technical parameters for Non-Voice, Non-Geostationary Satellite Service, it clearly would be premature for the Commission to attempt to do so now.

ORBCOMM also supports the Notice's recognition of the unique characteristics of low-Earth orbit operations and the need for a constellation of satellites. Thus, use of a system license, without the need to obtain separate authority in advance to launch and operate each satellite or replacement satellite, will simplify the Commission's review and oversight, as well as minimize the regulatory burdens on the system operators.

Similarly, ORBCOMM supports the Commission's proposal to issue blanket licenses for the user transceivers. In light of the expectation of hundreds of thousands of subscribers, individual licensing of transceivers would not be practical. In other contexts, including Radio Determination Satellite Service (RDSS), Mobile Satellite Service (MSS) and cellular, the Commission has found blanket licensing to be an effective method, and it should do so for Non-Voice, Non-Geostationary Satellite Service as well.

ORBCOMM also supports the proposal in the Notice to enforce construction and launch milestones for each of the systems. The Commission should ensure that service will begin in a timely manner after the licenses are issued, since the public

interest would be disserved by allowing spectrum to lie idle. Thus, the FCC's oversight should not end with the issuance of the system licenses.

ORBCOMM additionally believes that the Notice's proposal to allow the licensee to operate as either a common carrier or a private carrier is a sensible operational rule. For some purposes, specifically tailored offerings will best suit the customers' needs, while other services can efficiently be provided on a mass-market, generally available basis. Indeed, it is likely that the same systems will want to serve both markets.[10/] Particularly in light of the multiple entry and the accompanying competition that will occur, the needs of the marketplace will be satisfied. The Commission need not be concerned with designating capacity for common carriage or private carriage, but instead should allow the licensee to select the form of operation, and allow the marketplace to drive the nature of the services. Finally, even if operating as a common carrier, the Commission should apply streamlined regulatory treatment.

10/ This can be accomplished by an entity (whether affiliated with the licensee or not) acquiring capacity or service from the Non-Voice, Non-Geostationary Satellite Service licensee on a private carriage basis, and then reselling that service to the general public as a common carriage offering.

C. Responses to Additional Specific Questions Raised in the Notice

In addition to proposing broad rules describing the application and operation requirements for Non-Voice, Non-Geostationary Satellite Service, the Notice also raises several specific questions concerning narrower rule proposals. At footnote 10, the Commission proposed to modify its Rules to specify that for transfers or assignments that do not involve a substantial change of control, the public notice requirements would not apply. ORBCOMM supports this proposed rule, since it will simplify and expedite pro forma changes.[11/]

The Notice in paragraph 10 also proposes a new reporting requirement in Section 25.142(c). ORBCOMM does not object to such an obligation, since it will allow the Commission to monitor actual operations of the Non-Voice, Non-Geostationary satellite systems. In paragraph 22, the Notice suggests a filing window for renewal of licenses when approximately three years remain on the ten-year license. ORBCOMM believes that the filing

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[11/] Of course, the decision as to what constitutes a substantial change of control remains the responsibility of the Commission, and cannot be left entirely to the discretion of the licensee. The concept of "control" over a licensee is not always a cut and dried question. The Communications Act prohibits de facto as well as de jure transfers of control (i.e., the FCC looks beyond ownership percentages to determine control). See generally, In re Spanish International Communications, 48 Fed. Reg. 28548 (June 22, 1983). As a subsequent decision of the Commission observed, whether an entity has de facto control over a licensee is "a question conventionally suffused with illusiveness and subjectivity." Spanish International Communication Corporation, FCC 86R-64, released October 9, 1986, at ¶ 6. Thus, in passing on questions of whether control of applicants or licensee corporations rests in other entities, the Commission does not utilize any precise formula.

window will provide others with adequate notice of the licensee's intention with regard to continuing its service, at a point in time when the licensee should know what its plans will be for the next generation of satellites and services.

Paragraph 25 of the Notice seeks comment on the proposal to allow roaming licensees to fall within the blanket domestic earth station license. With respect to the legal basis for this rule, ORBCOMM observes that such a procedure is used currently for cellular subscribers (47 C.F.R. Section 22.912(b)), and the Commission should allow similar operation in the Non-Voice, Non-Geostationary Satellite Service. From a technical perspective, such roaming is likely to occur only within systems, at least initially, since the three applicants have proposed to use different modulation schemes and technical parameters. Such intrasystem "roaming" can readily be accommodated.

To the extent that there is a subsequent convergence of technical parameters, then the licensees can work out appropriate roaming agreements, and would have business incentives to do so. The Commission need not mandate such agreements, however, because unlike cellular service which is limited geographically, the nature of LEO satellite operations will ensure that all parts of the country will have access to service (although the time of availability is dependent on the system design and the number of satellites in the constellation).

Paragraph 27 of the Notice addresses the concern of the airline industry that usage of individual transceivers on board an aircraft could cause interference problems to the services in

the adjacent 108-137 MHz band. The proposed solution is a requirement that transceivers not radiate in the 108-137 MHz band, or that the transceivers be labelled to specify that they should not be used on board aircraft. ORBCOMM has no objection to proposed Section 25.135(b) as a solution to this potential problem.

Paragraphs 29-30 of the Notice address intersystem coordination, and indicate that the timing of any such formal coordination with new applicants will occur at the direction of the Commission, although information on file at the FCC should allow the new applicant to determine whether there will be any insoluble problems. The Notice also indicates that the results of intersystem coordination will not need to be filed. ORBCOMM agrees with the intersystem coordination procedures specified in the Notice, since it would likely be premature to require formal coordination immediately.[12/] The parties can be expected to act in good faith, and ORBCOMM fully expects that the Commission will be apprised of any disputes or bad faith, without the need for an explicit reporting requirement.

12/ ORBCOMM also agrees with the language in proposed Section 25.142(b)(3) making clear that it is not the responsibility of the licensees to design or re-engineer an applicant's system.

II. ORBCOMM Believes that the Commission Should Modify the Proposed Rules to Include a Renewal Expectancy and an Efficiency Measure

ORBCOMM disagrees with only two aspects of the Notice -- the failure to include a renewal expectancy, and the failure to incorporate criteria to ensure that the spectrum is fully utilized. The Notice recognizes the importance of and the need for a renewal or replacement expectancy, but concludes that it cannot incorporate such a provision because of the possibility of changed international agreements or domestic policy.[13/] The Notice's discussion of this topic leaves the inaccurate impression that changes are expected, but ORBCOMM is aware of none that have been proposed or that are even contemplated. ORBCOMM submits that such a risk exists for all services, and yet in other contexts the FCC has included a renewal expectancy. Indeed, the Communications Act specifically requires each applicant to acknowledge that a licensee obtains no "use of any particular frequency or of the electromagnetic spectrum as against the regulatory power of the United States because of the previous use of the same, whether by license or otherwise."[14/]

ORBCOMM urges the Commission to incorporate a renewal "expectancy," with the understanding that such an expectancy will not afford any protection against subsequent domestic or international regulatory changes that make it impossible for the Commission to renew the license of the Non-Voice, Non-

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13/ Notice at para. 21.

14/ 47 U.S.C. § 305.

Geostationary Satellite Service provider. On the other hand, such an expectancy will provide the licensee with a measure of assurance that if it provides sufficient service, and if the Commission continues Non-Voice, Non-Geostationary Satellite Service, then the licensee will be afforded an expectation of license renewal.

ORBCOMM also believes that the Commission should require in the application a demonstration that the limited spectrum will be used efficiently. The Notice recognizes the need for efficiency, but declined to establish specific criteria, suggesting instead that it will monitor developments to see if a rule is necessary. Notice at paras. 8-10. This issue was one of the more contentious issues addressed in the negotiated rulemaking. The proposed service rules submitted by ORBCOMM.

fair measure of dispute, however, because although there appeared to be a general consensus as to the need for the Commission to consider spectral efficiency for commercial Non-Voice, Non-Geostationary Satellite Service, there was not an agreement as to the particular minimum percentage availability selected or what measure the Commission should utilize to determine spectral efficiency.

The Commission does have analogous requirements for the Fixed Satellite Service, where satellites must be designed to make full use of the assigned spectrum through minimum transponder, bandwidth and power specifications. Differences between geostationary and low-Earth orbit satellite operations, however, add a degree of complexity that precludes the Commission from merely applying the same kind of rules to the non-geostationary satellites to ensure spectral efficiency. Non-geostationary satellites are in constant motion relative to the surface of the Earth. The amount of time that any one low-Earth orbit satellite is visible to a specific point on Earth is a function of the orbital parameters (e.g., altitude, inclination, eccentricity) and the latitude of the selected ground point. Under the ORBCOMM, STARSYS and VITA orbit proposals, each satellite will be visible to a point in the U.S. between about six to ten percent of the time. Increasing the number of satellites in a system increases the availability of service, and

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15/ (...continued)
transmit and/or receive a message directly to or from a space station operated as part of a commercial system.

a constellation of approximately twenty satellites can provide availability of service nearly 100% of the time.

A potential for a low-Earth orbit satellite system to fail to use assigned spectrum fully arises because a two satellite system, which would be visible in the U.S. at most only 20% of the time, would take up the same interference budget for coordinating with other systems as a twenty satellite system providing nearly full time availability in the U.S. This occurs because the practical impossibility of intersystem sharing of the spectrum for feeder link or gateway link operations will arise whether the second system contains two or twenty satellites.[16/] Thus, a two satellite system will occupy a spectrum assignment equivalent in size to a twenty satellite system, although service availability would be far lower.

The initial rule proposed by ORBCOMM, STARSYS and VITA would have avoided such a failure to utilize fully the assigned spectrum by mandating a system design providing coverage a

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[16/] The inability of separate low-Earth orbit satellite systems to prevent precession vis-a-vis the other systems will occur regardless of the number of satellites, so that for a system providing near full time coverage, there will be instances of satellites from another system simultaneously appearing within the main beam width of the gateway earth station, thereby effectively causing random outages of service. While a second system consisting of only two satellites will cause fewer such outages, there will still be enough of them (and occurring randomly) to create an unacceptable reduction in service reliability. On the other hand, it may be possible for two or more two-satellite systems to share the same feeder links, if their orbits are sufficiently spaced so that multiple satellites would be visible to the same earth station only very rarely, if at all. However, such sharing would be dependent on the ability to place the different systems' satellites into precise orbits and to maintain them in those relative orbital locations.

specified percentage (75%) of time.[17] Although all of the members of the negotiated rulemaking Committee agreed that "spectral efficiency" is an important goal, there was no consensus as to what the particular minimum percentage should be. ORBCOMM believes the Commission should adopt the original proposal of ORBCOMM, STARSYS and VITA, and specify a minimum percentage availability test, at least for commercial Non-Voice, Non-Geostationary satellite systems.

ORBCOMM recognizes, however, that such a requirement may prove onerous in particular circumstances, given the untried nature of the service. To some extent, service availability is a business decision for the applicants (balancing the costs of additional satellites versus the nature of service offered to the public). In addition, there was also disagreement in the negotiated rulemaking as to whether service availability, standing alone, was the only relevant measure of spectral efficiency. VITA suggested other factors for the Commission to consider in evaluating efficiency of service, such as the amount of spectrum used by the system and its compatibility with other systems, the scope of proposed geographic services, the communications needs to be served, and the cost of the proposed system.

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[17] The 75% figure for commercial systems was selected as an approximation of substantial use of the assigned spectrum; a service availability of 100% would be impractical, because service availability is a non-linear function of the number of satellites for very high percentages, and the resulting cost for obtaining the last few percentage points of coverage would be extremely high.

Alternatives to the requirement of a specified minimum availability were proffered during the negotiated rulemaking, including a requirement that the application merely include a demonstration of percentage of time service was available,[18] and more generalized requirements that the application include a demonstration of efficient use of the assigned spectrum.[19]

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[18] ORBCOMM suggested as an alternative to a minimum percentage of time availability the following provision addressing efficiency:

> In order that the Commission can determine the spectral efficiency of the proposed Non-Voice, Non-Geostationary Satellite Service (< 1 GHz) system, Applicants must include in their application a demonstration of service availability within the United States, measured as a percentage of time during a 24 hour period when service is available averaged over all points within the United States. This should be calculated at the time system deployment for purposes of the certification in § 25.403(a) will occur, along with an estimate of how many months after licensing such certification is expected to occur. For purposes of this provision, service is deemed to be available if there is the potential for a user transceiver to transmit and/or receive a message directly to or from a space station operated as part of the Non-Voice, Non-Geostationary Satellite Service (< 1 GHz) system.

ORBCOMM also provided the Committee with a methodology for calculating the percentage of time availability of service in the U.S., using a computer program based on one-quarter degree by one-quarter degree areas of the country. This approach also allows for weighting of the areas by population.

[19] VITA suggested as a proposed efficiency section:

> Applicants shall include in their applications a showing that their system represents an efficient use of spectrum and orbital resources. Such a showing may take into account the proposed service area, service requirements, and nature of their contemplated customer base, availability of the service, timing of implementation, amount of spectrum employed, the preclusive effect of the system on other potential systems, cost and other factors, as appropriate.

(continued...)

ORBCOMM believes that at the very least, the Commission should include a requirement for a spectrum utilization demonstration in the application so that the Commission can evaluate the relative efficiency of the proposals. This would be also be very helpful should the FCC wish to later consider adopting specific minimum availability criteria.

CONCLUSION

The Commission now has before it an extensive record, including the applications of several proposed system operators and related comments, the comments developed in the domestic and international allocation proceedings, and the input to, and output from, the negotiated rulemaking proceeding. The Commission appears to have considered all of this information in crafting the Notice, and has proposed rules that facilitate multiple entry and incorporate flexibility. ORBCOMM thus supports the proposals in the Notice, and urges the Commission to proceed expeditiously with the adoption of the licensing and service rules (with the two modifications suggested herein). Such a prompt conclusion of this proceeding and licensing of Non-

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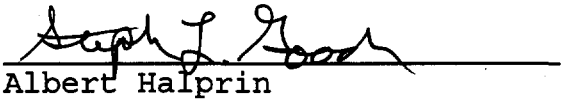
[19] (...continued)
Leosat submitted as a proposed provision concerning efficiency:

> Applicants must also file information demonstrating compliance with all requirements of this section. Applicants must also demonstrate that they will use modulation and other spectrum sharing techniques to ensure maximum effective use of this spectrum and that they will not cause unacceptable interference to any NVNG Satellite Service (< 1 GHz) system authorized to construct or operate.

Voice, Non-Geostationary satellite systems will ensure that the public interest benefits of these new services will be maximized.

Respectfully submitted,

By 

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